

**PROCEEDINGS FROM THE  
BUSINESS-HIGHER EDUCATION FORUM'S  
2013 WINTER MEMBER MEETING**

*February 21–22, 2013*

*Washington, D.C.*

**WINTER MEETING**



*Creating Solutions. Inspiring Action.*

## ABOUT BHEF

Now in its 35th year, the Business-Higher Education Forum is the nation's oldest membership organization of Fortune 500 CEOs and research university presidents dedicated to advancing innovative education and workforce solutions and improving U.S. competitiveness. BHEF's business and academic members collaborate in regions across the country to design and deploy education-workforce solutions in the high-demand and emerging fields that are so critical to innovation and national security. BHEF and its members drive change locally, work to influence public policy at the national and state levels, and inspire other leaders to act.

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## ABOUT BHEF'S RECENT WORK

In the last five years, intensive project development and system dynamics modeling produced powerful insights into America's workforce needs. To heighten the impact of this work, BHEF has developed a model of strategic business engagement in higher education. Additionally, BHEF has developed a comprehensive strategy to scale these solutions nationally and focus on the structural misalignment in the U.S. education and workforce pipeline.

The result is the National Higher Education and Workforce Initiative, through which BHEF members align a broad array of impact levers to focus on a region's specific workforce needs.

In June 2012, as part of the initiative's initial roll-out, BHEF presented its first cohort of 12 workforce projects. BHEF plans to scale the initiative through a multi-faceted approach:

- 1) Launch second and subsequent cohorts in 2013 and beyond;
- 2) Create and link networks of campuses working in common fields;
- 3) Add projects within BHEF members' university systems; and
- 4) Complement those with projects developed in partnership with national industry and academic associations.

This cohort's projects focus on fields such as cybersecurity, data and analytics, energy, water and materials science, and engineering. Specific projects have received generous support from philanthropies; for example, the Northrop Grumman Foundation is supporting undergraduate cybersecurity programs on two University System of Maryland (USM) campuses, and the Alfred P. Sloan Foundation is supporting BHEF to scale undergraduate cyber programs to other USM campuses. While these regional projects share common design principals, to date they have focused predominantly on the content knowledge needed in these fields. Looking ahead, the projects will also expand to address core workplace competencies.

Additionally, BHEF has partnered with the William and Flora Hewlett Foundation to examine the misalignment of educational outcomes with the workplace competencies (such as critical reasoning, communications, and the ability to work in multi-cultural teams) required by business. BHEF will incorporate interventions that build these attributes into the regional workforce projects to ensure that students are equipped with both the core content knowledge and the 21st century workplace competencies demanded in the innovation economy.

The 2013 Winter Member Meeting presented an opportunity for leaders within this first cohort to report on the specific projects and partnerships, sharing their insights and lessons learned with other members and discussing upcoming events that will continue to advance the overall initiative. This new model of strategic business engagement between business and higher education will effect deep, sustainable change in undergraduate outcomes and connect to high-demand jobs, ultimately maintaining U.S. competitiveness and ensuring national security.

## ABOUT THE MEETING

Record numbers of thought leaders from across the nation came together at BHEF's 2013 Winter Member Meeting to address the workforce competitiveness challenges confronting the U.S. government and U.S. companies. These challenges are rooted in a significant shortage of highly educated and skilled employees, especially in emerging fields that are critical to innovation. New undergraduate pathways are needed to effectively prepare students with both the expert content knowledge and 21st century workplace competencies needed by business and government to maintain competitiveness and ensure national security.

This meeting was structured around sessions designed to mobilize BHEF's unique membership to address the workforce challenges facing our country.

### Goals of the meeting included:

- Discussing the importance of active, strategic partnerships to turn solutions into results that keep the pipeline of innovation flowing.
- Identifying real, scalable, higher education-workforce solutions.
- Incorporating key design principles into undergraduate programs being developed by BHEF business and academic members.
- Implementing key programmatic milestones and the dissemination of insights.

Discussions highlighted both the emerging fields (such as data science and analytics) that drive innovation and workforce needs, as well as the specific, member-led regional projects created to respond to these needs. Members and guests discussed scaling workforce innovations using strategic business engagement that leads to deep partnerships with higher education, developing new undergraduate pathways that give students expert content knowledge as well as 21st century workplace competencies, and utilizing disruptive technologies to improve learning outcomes. Taken together, these discussions illustrated that BHEF members are uniquely positioned to address the education-workforce misalignment exhibited in many regions across the country.

### A set of critical design principals emerged from the meeting:

- The emerging fields on which many BHEF Cohort I and II projects are focused are highly multi-disciplinary and require trans-disciplinary student pathways.
- The curriculum required in these programs must expose students to technical, political, policy, and ethical issues in a global context.
- The design of the student experience in these programs must build 21st century workplace competencies emphasizing lifelong learning and change.
- Business-higher education partnerships must be at the core of pathway development and the student experience.
- Strategic business engagement requires an equal response from higher education at each of the levers.
- Disruptive learning practices and tools can present powerful opportunities to scale, improve learning, and lower cost.
- Pathway development will require unpacking skills and competencies and back-mapping from the professional science masters through four-year undergraduate into community college and high school.
- Data science represents both a discipline and a tool in several projects, e.g., health, water, energy, and agriculture informatics.

The opening program examined new opportunities for innovation through data science and analytics and the implications such emerging fields have on evolving workforce demands. The next morning, the first plenary explored BHEF's regional workforce projects and how they are integrating BHEF's Strategic Business Engagement Model. This discussion highlighted the unique scaling strategy BHEF has created and how insights from the past year's work will influence subsequent cohorts of regional projects. This was followed by a lunch conversation investigating the incorporation of 21st century workplace competencies, in addition to content knowledge, as a necessary principle in the design of regional projects in order to increase graduates' effectiveness in government, business, and non-profit environments.

Finally, the meeting concluded with a second plenary that built on the insights from BHEF's U.S. STEM Education Model, exploring how the adoption of disruptive technologies and practices in higher education could be integrated into BHEF's National Higher Education and Workforce Initiative to improve learning, lower costs, and potentially offer alternative certification models for the original content produced through BHEF's projects.



BHEF member Molly Corbett Broad, Roy Romer, BHEF member Roger Ferguson, and Merrilea Mayo.

## ACTION-ORIENTED SOLUTIONS

**B**HEF is committed to developing action-oriented solutions that harness the natural areas of influence of its members in strategic, high-impact ways. To this end, below are a series of takeaways from the two days of discussion among BHEF members and special guests.

I. The premium that global economic integration places on continuous innovation increases the demands on organizations and workers, fundamentally altering the workforce and the skills needed to thrive. This innovation premium reflects the increasing complexity of the problems and challenges that businesses are required to solve today and the rapid pace at which these solutions must be brought to market. The misalignment between the labor supply and demand for workers with innovation skills creates the persistent problem of stubbornly high unemployment at the same time jobs go unfilled.

### *Innovation*

The demand for innovation is not limited to new products. Successful companies must innovate throughout the organization—in research and development, in product design and engineering, in supply chain and manufacturing, and in finance and marketing. Pushing the boundaries on innovation requires new innovation tools that can be applied to all dimensions of business. But an essential, often undervalued ingredient in innovation is a highly educated and skilled workforce: innovation requires increased emphasis on organizations where employees are lifelong learners. Innovation workers must not only possess exceptional technical skills, but also 21st century workplace competencies and the ability to develop new skills while maintaining existing ones. These are the “T-shaped” professionals<sup>1</sup> that the best global companies demand.

### *Misalignment*

Structural misalignment in the U.S. education and workforce pipeline results in large-scale under- and unemployment while large numbers of jobs remain vacant. Nationally ten million Americans are unemployed while three million jobs are unfilled. Regions of the country experience the same phenomenon. In Massachusetts, 250,000 are unemployed while 125,000 jobs go unfilled. Even among high school and college graduates who can fill jobs, business leaders cite widespread deficiencies in 21st century workplace competencies.

Three facts can frame the conversation:

- About 50 percent of employers and students say there is readiness, while 86 percent of educators say there is readiness.
- One-third of education providers couldn't cite job placement rates, or they overestimated.
- Only one-half of youth say that education will help them find a job. But when asked if lack of education is a barrier to employment, only 40 percent of employers say yes.<sup>2</sup>

<sup>1</sup> Donofrio, N., Spohrer, J., & Zadeh, H. (n.d.). Research-Driven Medical Education and Practice: A Case for T-Shaped Professionals. Retrieved from <http://www.ceri.msu.edu/wp-content/uploads/2010/06/A-Case-for-T-Shaped-Professionals-20090907-Hosseini.pdf>.

<sup>2</sup> Mourshed, M. “Opening Program: How Emerging Fields, Such as Data Science, are Reshaping Workforce Needs.” Business-Higher Education Forum 2013 Winter Member Meeting. Washington, D.C. 21 February 2013.

## Workforce

A recent McKinsey report, *Big Data: The Next Frontier for Innovation*, indicates that U.S. demand for talent with data analytics training will outstrip supply by nearly 200,000 data scientists and about 1.5 million analytics-enabled managers, thus jeopardizing innovation in U.S. companies. A more recent report, *Education to Employment*, also published by McKinsey, finds systemic deficiencies in education and job training systems, producing high levels of unemployment in the face of entry-level vacancies. This deficit will strain the economy, particularly as it needs an influx of skilled workers.

II. Recent organizational shifts require more flexible employees with a combination of deep content knowledge as well as 21st century competencies that enable them to play multiple roles and shift rapidly among tasks and working environments. The evolution of business and workforce requires employees, particularly newly hired employees, to possess a more robust set of technical skills and competencies, such as the ability to think critically, work in multi-cultural teams with a global mindset, and adapt to rapid change.

The demands of an entry-level job have increased due to rapid technological changes, globalization, the new complexities surrounding the challenges businesses face, and the streamlining of operations, to name a few. As a result, employees are expected not only to have deep content knowledge, but also to demonstrate competencies such as agility and the capacity to learn new things. These diverse expectations expose entry-level employees to a greater level of experiences and environments earlier in their careers.

The concept of a “T-shaped” professional refers to an individual with a deep knowledge of his or her discipline (the vertical leg of the T), but also the breadth of knowledge that allows the individual to see how one discipline interacts with others (the horizontal arm of the T). The T-shaped professional stands in contrast to the I-shaped person, an individual who specializes in one field and whose skills may come to be devalued following changes in technology or market conditions.

IBM has long advocated for the creation of more T-shaped professionals and has, since 2004, worked in partnership with higher education, government, and industry to promote the discipline of Service Science, Management and Engineering (SSME). Through SSME, IBM hopes to increase the number of students studying science, technology, engineering and math, more commonly known as the STEM fields. The T-shaped individual, as created through SSME, is both a collaborative innovator and an adaptive innovator, prized for the depth of their problem-solving skills in one field and the breadth of their communication skills in many others.

III. More strategic business and higher education engagement will build effective pathways to work in emerging fields that spur innovation. The business and higher education partnership must be at the core of trans-disciplinary pathway development to meet regional workforce needs in emerging fields. These fields, including data science and analytics, are broadly considered new frontiers for innovation.

The Strategic Business Engagement in Higher Education model aligns key corporate “levers” to move from traditional *transactional* engagement to *strategic* engagement in order to maximize impact. Each lever has independent impact, but aligning business with higher education can produce a powerful synergism. The levers include:

- **C-Suite executives** use their personal leadership to 1) shape internal and external messaging to raise community awareness of 21st-century workforce demands; 2) build a critical mass of peers focused on undergraduate education in support of workforce goals; and 3) guide corporate policy development to ensure the corporation’s actions align with its strategic education and workforce goals.
- **Philanthropy Efforts** serve as vital catalysts for positive, lasting, and high-impact change in higher education if invested strategically. Examples include support for creating new undergraduate models, early college high schools, virtual course tools that integrate innovative classroom instruction techniques, and operating support as organizations bring new, evidence-based practice to scale.
- **Employee Engagement** deploys the hundreds or thousands of employees within an organization to support strategic education goals. These individuals represent human capital that can be mobilized to act both inside and outside the corporation, providing grassroots support for a company’s investments in education and becoming major advocates for the work.
- **Core Competencies and Expertise** include intellectual capital and unique subject matter expertise that business can utilize to strengthen the education-to-workforce pipeline, collaborating with higher education to create new courses, programs, and student-learning experiences.
- **Funded Research** at university labs can serve as platforms for early research experiences for freshmen and sophomores, which have been shown to increase student persistence.

IV. Powerful scaling opportunities exist by leveraging regional projects, networks, university systems, and national industry and academic association partners. BHEF’s National Higher Education and Workforce Initiative is advancing its work by scaling projects that utilize evidence-based practices for increasing student persistence, particularly in the first two years of the undergraduate experience.

The National Higher Education and Workforce Initiative serves as a platform for business-higher education collaboration to create new higher education pathways to high-demand careers in data science and analytics, cybersecurity, water, energy, and materials science and engineering.



### **BHEF uses a four-part scaling strategy:**

- Implementation of 12 Cohort I projects advancing rapidly and development of Cohort II projects proceeding for June 13 launch;
- Creation of networks of projects developing programs in common fields, e.g., cyber and data analytics to share resources, massive open online courses (MOOCs), etc.;
- Scaling within multi-campus systems of public higher education (CSU, UC, MD, MO, MA, CUNY, WI); and
- National partnership engagements with sectors—such as the Aerospace Industries Association, the National Defense Industrial Association, the Information Technology Industry Council, and Semiconductor Industry Association to name a few—promise deeper connection with a broad array of member companies and maximum impact.

Cybersecurity has emerged as a major focus of several of the BHEF regional pilots, leading to BHEF's creation of a National Undergraduate Cybersecurity Network. The network was launched last December at a convening in New York City hosted by the Sloan Foundation and was attended by representatives from industry, higher education, and government. Networks such as this will provide a forum for industry to articulate its needs and workforce gaps, and for colleges and universities to develop programs that directly address these needs. This network is the first of several that BHEF plans to launch to address different sectors and provide a scaling and dissemination vehicle for the regional pilots. While BHEF is developing discrete pilots across the country, the network will allow these pilots to collaborate and disseminate products and insights to the benefit of the broader community.

BHEF's member-led regional projects can serve as proof points for strategic business engagement to meet workforce demands and produce learning that can be used more broadly to address systemic deficiencies in the U.S. education-workforce pipeline.

**V. Disruptive technologies can enable more effective learning and a better understanding of learning outcomes when integrated into blended learning environments.** Advances in technology-assisted learning, such as MOOCs used in blended learning environments, provide advantages, including immediate, individualized feedback that can improve teaching and learning while also expanding the capacity of institutions to serve more students at a lower cost.

Scaling disruptive technologies, including intelligent learning tools, can increase student learning and persistence for large numbers of students. BHEF's system dynamics modeling for the Office of Naval Research has produced findings and insights into programs and policies that promote education and workforce alignment. Specifically, the simulations have demonstrated that new models of engagement between business and universities in which students receive multiple interventions, some relatively low-cost, in freshman and sophomore years can maximize persistence in later years. In addition, scaling disruptive technologies, including intelligent learning tools, can increase student learning and persistence for large numbers of students and have the potential to significantly lower educational costs per student.

Many of these technologies are very new and warrant further study. Questions about MOOCs, for instance, abound. How should institutions assess the prior learning of students who have completed a MOOC and are now signing up for "traditional" courses? By what means will they determine how to assign credits for completed coursework and from which MOOCs? How does the advent of MOOCs affect the established business model and the bottom line? Can institutions afford the required adaptive learning platforms? What teaching methodology is best suited to this emerging format? And how will MOOCs help individual institutions meet their workforce missions?

## NEXT STEPS

**B**HEF is executing on its National Higher Education and Workforce Initiative through the implementation of key programmatic milestones and the dissemination of insights at high-profile conferences, panels, and hosted convenings:

### *Milestones*

- National Undergraduate STEM Education Partnership Meeting, co-hosted by the Information Technology Industry Council  
*March 21, 2013, Washington, D.C.*
- Strengthening Pathways Event, presenting BHEF's Ohio regional projects, co-hosted by Battelle  
*March 25, 2013, Columbus, OH*
- National Summit on Industry's Critical Need for a Workforce with 21st Century Workplace Competencies, co-sponsored with the Hewlett Foundation  
*March 26, 2013, Washington, D.C.*
- Inaugural meeting of the Maryland Undergraduate Cybersecurity Network, co-hosted by the University of Maryland Advanced Cybersecurity Experience for Students Program  
*April 5, 2013, College Park, MD*
- Upgrade America, hosted by BCSA  
*April 15-16, 2013, Washington, D.C.*
- Release of Version 2.0 of BHEF U.S. STEM Education Model, co-hosted by the Office of Naval Research  
*June 10, 2013, Washington, D.C.*
- BHEF Summer Meeting  
*June 10-11, 2013, Washington, D.C.*
- Introduction of Cohort II, U.S. STEM Solutions Summit, co-hosted by *U.S. News and World Report*  
*June 18, 2013, Austin, TX*
- National Conversation on Cybersecurity, co-hosted by the Woodrow Wilson Center  
*Fall 2013, Washington, D.C.*

## ATTENDEE LIST

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BHEF CEO Brian Fitzgerald (right) and BHEF Chair Wes Bush (center) congratulate emeritus member Charles Reed on his retirement.



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